

ABSTRACT

In a substrate processing apparatus for processing a substrate for manufacturing a semiconductor device, a mist passage (5) is formed to pass through a part of a processing vessel (2) as an object to be cooled. There are disposed a mist generator (64) that generates a mist, and a gas supply source (62) that supplies a carrier gas for carrying the generated mist. A temperature of the part to be cooled is detected by a temperature sensor (49). When the detected temperature exceeds a predetermined temperature, a water mist, for example, is allowed to flow into the mist passage so as to cool the processing vessel by a heat of evaporation of the mist. Thus, the temperature of the processing vessel can be promptly lowered, and thus a plasma process can be performed under an atmosphere of a stable temperature.